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Richard Florida's creative capital in a trading regional economy: a theoretical investigation

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Abstract We first construct a theoretical model of a regional economy with two sectors. One sector uses physical and creative capital—in the sense of Florida (The rise of creative class. Basic Books, New York, NY, 2002)—to produce a knowledge good that is traded. The other sector uses physical and social capital to produce a good that is not traded. Second, we provide the first formal analysis of the creative capital accumulation decision faced by individuals in this regional economy and we compute the optimal length of time during which creative capital is accumulated. Next, we determine the relative return to creative capital and we use this return to conduct comparative statics exercises with our model's four parameters. Finally, we show that for a given interest rate, the relative price of the nontraded good is higher in regional economies where more creative capital is accumulated.

JEL Classification I290 · J240 · R110

1 Introduction

1.1 Human, creative, and social capital

That physical capital is a salient input in virtually all production processes has been known to economists and to regional scientists for quite some time. In addition to

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physical capital, the work of [Mincer \(1958\)](#), [Arrow \(1962\)](#), and [Becker \(1962\)](#) has stressed the important role played by *human capital* in modern production processes. As used by these three distinguished researchers, the term human capital refers to the stock of productive skills and technical knowledge embodied in labor and it is significant primarily because it is a means of production into which more investment yields additional output.

Moving beyond production processes per se, in contemporary times, regional scientists and urban economists—see, for instance, [Glaeser \(2003\)](#), [Glaeser et al. \(2001\)](#), and [Shapiro \(2006\)](#)—have pointed to the importance of human capital in enhancing the growth of both cities and regions. According to this view, human capital is a potent predictor of both regional and urban success because human capital enables individuals to adapt well to change and because very skilled individuals in high skilled industries are likely to come up with novel and, over time, more novel ideas. In this regard, it is germane to note that the work of [Glaeser \(1994\)](#) clearly demonstrates that the generation of new ideas is significant and that there is a clear nexus between the skills possessed by city residents and the growth of these cities. This discussion tells us that from the standpoint of production, both physical and human capital are important. In addition, human capital plays a particularly salient role in enhancing the growth of cities and regions.¹

In recent times, in addition to the two kinds of capital that we have just discussed, researchers interested in studying the growth of cities and regions have focused on two other kinds of capital, namely, *creative and social capital*. Therefore, we first discuss the concept of creative capital and then we shall focus on the notion of social capital. The concept of creative capital was popularized by [Florida \(2002\)](#) in his best selling book *The Rise of the Creative Class*. According to Florida, the *creative class*—comprising professionals such as doctors, lawyers, scientists, engineers, university professors, and, notably, bohemians made up of artists, musicians, and sculptors—possesses *creative capital* and this group produces ideas, information, and technology and it is these outputs that are increasingly important for the growth of cities and regions. Consequently, cities and regions that want to succeed must attempt to attract members of this creative class who, according to Florida, are the wave of the future. In addition, Florida points out that when setting policy, city officials need to comprehend that members of the creative class tend to choose those cities that have tolerant environments, diverse populations, and good jobs.

So far so good but one important question that now arises is this: how is the concept of creative capital different from the now familiar notion of human capital? There is some dispute on this fundamental question in the literature. On one side, [Glaeser \(2005\)](#) has suggested that there is little or no difference between the concepts of creative and human capital. On the other side, [Marlet and Van Woerkens \(2007\)](#) have argued that the notion of creative capital is *a broader* concept than the notion of human capital.

Now, in empirical work, the notion of human capital is generally measured with education or with education-based indicators. The key point to note here is that

¹ Recently, [Camagni \(2008\)](#) and [Capello et al. \(2008\)](#) have introduced the notion of “territorial capital” to describe the productivity enhancing potential of all local and spatially banded characteristics in a region. This broader concept of capital can subsume in it both physical and human capital.

although Florida's creative class possesses creative capital, as noted by [Marlet and Van Woerkens \(2007\)](#), the accumulation of creative capital does *not* necessarily depend on the acquisition of formal education. In other words, while the creative capital accumulated by some members of Florida's creative class—such as doctors, engineers, and university professors—clearly does depend on the completion of many years of formal education, the same is not necessarily true of other members of this creative class such as artists, painters, and poets. Individuals in this latter group may be “born creative” and hence possess creative capital despite having completed very little or no formal education.

Given this state of affairs, our reading of the extant literature leads us to agree with the position of [Marlet and Van Woerkens \(2007\)](#). In other words, we contend that there is little or no difference between the notions of human and creative capital when the accumulation of this creative capital—possessed by doctors, engineers, etc.—depends on the completion of many years of formal education. In contrast, there can be a lot of difference between the notions of human and creative capital when the accumulation of this creative capital—possessed by artists, sculptors, etc.—does not necessarily depend on the completion of formal education. Since creative capital is of two types, it is a broader concept than the notion of human capital.²

The notion of *social capital* originated in the work of [Bourdieu \(1986\)](#), [Coleman \(1988\)](#), and [Putnam \(2000\)](#) but, as used today, this term refers to a rather amorphous concept. Although there are many ways to define social capital, for our purpose, it is useful to think of social capital as “the product of investment strategies, individual or collective, consciously or unconsciously aimed at establishing or reproducing social relationships that are directly usable in the short or long term” ([Bourdieu 1986](#), p. 251). Put differently, social capital “arises because of dense interactions between social actors who create an intricate web of relational networks around themselves” ([Barros and Nunes 2008](#), p. 1555). When viewed in this manner, social capital can be thought of as the development potential of interactive networks.

The discussion in the previous paragraph tells us that social capital exhibits several characteristics that distinguish it from other kinds of capital. Further, like the notion of creative capital, social capital can be but does not have to be similar to human capital. This notwithstanding, for concreteness, in the remainder of this paper we shall follow [Paldam and Svendsen \(2000\)](#), [Chou \(2006\)](#), and [Islam et al. \(2008\)](#) and treat social capital as a distinct kind of capital that assists in the production of one or more final goods. With this background on human, creative, and social capital, we are now in a position to state the objectives of our paper.

1.2 Our objectives

The trinity of human, creative, and social capital has received a lot of attention in contemporary times and the academic literature on these concepts spans several

² In this paper, we shall adopt the first interpretation of creative capital. In other words, we shall think of creative capital as a kind of capital that can only be accumulated by spending time in school, i.e., by obtaining a formal education.

disciplines and hence is, as one might expect, sizeable.³ Even so, two points are worth emphasizing. First, there are very few *theoretical* studies that have attempted to model one or more of these concepts explicitly and in the context of a regional economy.⁴ Second, to the best of our knowledge, there are *no* theoretical studies that have attempted to model the interaction between different kinds of capital and the production of final goods when the pertinent final goods are produced in a *trading* regional economy.

Given this lacuna in the extant literature, in our paper, we first construct a theoretical model of a regional economy with two sectors. One sector uses physical and creative capital—in the sense of Florida (2002)—to produce a knowledge good that is traded. The other sector uses physical and social capital to produce a good that is not traded. Second, we provide the first formal analysis of the creative capital accumulation decision faced by individuals in this regional economy and we compute the optimal length of time during which creative capital is accumulated. Third, we determine the relative return to creative capital and we use this return to conduct comparative statics exercises with the four parameters of our model. Finally, we show that for a given interest rate, the relative price of the nontraded good is higher in regional economies where more creative capital is accumulated.

The remainder of this paper is organized as follows. Section 2 first delineates the theoretical model of a two sector regional economy and then this section analyzes the creative capital accumulation decision faced by this region's individuals. Section 3 computes the lifetime earnings of a member of the creative class in our regional economy as a result of his optimal accumulation of creative capital. Next, this section determines the relative return to creative capital. Section 4 first uses this relative return to conduct comparative statics exercises with the four parameters of our model. Then, this section shows that for a given interest rate, the relative price of the nontraded good is higher in regional economies where more creative capital is accumulated. Section 5 concludes and discusses ways in which the research in this paper might be extended.

2 The two sector model

2.1 Preliminaries

The model of this section is adapted from Blanchard (1985). Consider a trading regional economy with two sectors. One sector uses physical capital K and creative capital K_c to produce a knowledge good—such as a computer chip or a drug—that is traded. Physical capital K and creative capital K_c earn factor rewards denoted by r and r_c respectively. The other sector uses physical capital K and social capital K_s to produce a good—such as a local handicraft or a restaurant chef's meal—that is not traded.

³ For a more detailed corroboration of this claim, the reader should consult Mincer (1958, 1974), Becker (1962, 1993), Coleman (1988, 1989, 1990), Helliwell and Putnam (1995), Knack and Keefer (1997), Putnam (2000), Chin and Chou (2004), Chou (2006), Barros and Nunes (2008), and the many sources cited in these references.

⁴ Recently, Chin and Chou (2004) and Chou (2006) have analyzed growth models in which output is a function of physical and social capital. However, the questions addressed by these two papers are very different from the questions addressed by us in this paper.

Social capital K_s earns a factor reward denoted by r_s . The interest rate in our regional economy is r . All factor rewards are expressed in terms of the tradable good. We suppose that both sectors of our regional economy have production technologies that are linear homogeneous. Therefore, we can write $r_c = r_c(r)$, where $r'_c(r) < 0$.

Individuals in our regional economy have uncertain lifetimes with instantaneous death probability denoted by π . Therefore, the reader will note that the discount rate in our regional economy is effectively $r + \pi$. We suppose that our regional economy is in a stationary or steady state with constant (time independent) factor rewards. Let us now focus on production in the tradable sector. In our simple model, the production of the knowledge good in the tradable sector is the primary activity of our region's creative class. However, the production of this knowledge good requires the use of creative capital and, consistent with the discussion in footnote 2, this creative capital has to be accumulated over time by acquiring a formal education (spending time in school). Therefore, our next task is to formally study this creative capital accumulation decision.

2.2 Creative capital accumulation decision

Each individual in our regional economy has a unit endowment of time. This time can be used to work in the nontradable sector, or to work in the tradable sector (after acquiring a formal education), or to acquire a formal education. If an individual spends a time interval T in school then he accumulates an amount of creative capital given by AT^α , where $\alpha \in (0, 1]$ is a "return to schooling" parameter. Obviously, during the time that is spent in school, all employment income is foregone. In addition, to keep the subsequent mathematics tractable, we shall abstract away from the cost of attending school.

An individual in our regional economy contemplating the creative capital accumulation decision will want to maximize the benefit from accumulating creative capital (spending time in school). This benefit consists of two terms. The first term is the individual's discounted value of earnings from creative capital accumulation starting on the first date after graduation from school, i.e., from date T onwards. Mathematically, this first term is given by $\int_T^\infty e^{-(r+\pi)t} AT^\alpha(r_c)dt$. The second term is the income foregone from working in the nontradable sector and, mathematically, this second term equals $r_s/(r + \pi)$. With this description in place, at birth (time $t = 0$), an individual's creative capital accumulation decision involves selecting T to solve

$$\max_{\{T\}} \left[\int_T^\infty e^{-(r+\pi)t} AT^\alpha(r_c)dt - \frac{r_s}{r + \pi} \right]. \quad (1)$$

Inspecting the maximization problem in (1) it is clear that for a sensible interior solution to exist, there must be a T for which the integral in Eq. (1) exceeds $r_s/(r + \pi)$. Now, assuming an interior solution, the first order necessary condition for an optimum

to the above problem is

$$\frac{d}{dT} \int_T^{\infty} e^{-(r+\pi)t} A T^{\alpha}(r_c) dt = -e^{-(r+\pi)T} A T^{\alpha}(r_c) + \frac{\alpha A T^{\alpha-1}(r_c)}{r + \pi} e^{-(r+\pi)T} = 0. \quad (2)$$

Simplifying Eq. (2) gives us an expression for the optimal length of time T^* during which creative capital ought to be accumulated by an individual in our regional economy. Specifically, this simplification gives us

$$T^* = \frac{\alpha}{r + \pi}. \quad (3)$$

Inspection of Eq. (3) yields three straightforward conclusions. First, we see that less sharply decreasing returns to education or to the accumulation of creative capital (α close to 1) lengthens the optimal amount of time T^* spent in school. Second and in contrast, a higher effective discount rate ($r + \pi$) shortens the optimal amount of time T^* spent in school. Finally and somewhat counterintuitively, we see that the reward to creative capital r_c does *not* affect the optimal schooling time T^* . This last result arises in our model because the reward r_c *multiplies* the first term in the benefit function—see Eq. (1)—that depends on T . We now proceed to shed light on aspects of the creative class. Specifically, we first compute the lifetime earnings of a member of the creative class as a result of this member's optimal accumulation of creative capital and then we ascertain the relative return to creative capital.

3 Aspects of the creative class

3.1 Lifetime earnings

To compute the lifetime earnings—discounted at the rate $(r + \pi)$ —of a member of the creative class who has accumulated creative capital optimally, we shall use Eq. (3). Substituting the value of T^* from Eq. (3) into the first term in Eq. (1) gives us an expression for the lifetime earnings that we seek. Specifically, we get

$$\begin{aligned} \int_{T^*}^{\infty} e^{-(r+\pi)t} A (T^*)^{\alpha}(r_c) dt &= \int_{\alpha/(r+\pi)}^{\infty} e^{-(r+\pi)t} A \left[\frac{\alpha}{r + \pi} \right]^{\alpha} (r_c) dt \\ &= \frac{1}{r + \pi} A \left[\frac{\alpha}{r + \pi} \right]^{\alpha} (r_c) e^{-\alpha}. \end{aligned} \quad (4)$$

Inspecting Eq. (4), we see that the discounted lifetime earnings of a member of the creative class in our regional economy depends positively on the optimal length of time spent in school $[\alpha/(r + \pi)]$ and on the return to creative capital (r_c). Our next task is to determine the relative return to creative capital in our regional economy.

3.2 Relative return to creative capital

The reader will note that in equilibrium, the lifetime earnings of a member of the creative class who produces the knowledge good must be equal to the lifetime earnings of an individual with social capital working in the nontradable sector of the regional economy under study.⁵ From the discussion in the paragraph preceding Eq. (1) we know that the latter lifetime earnings is $r_s/(r + \pi)$. Therefore, equating this last expression with the expression on the right-hand-side (RHS) of Eq. (4) we get

$$\frac{1}{r + \pi} A \left[\frac{\alpha}{r + \pi} \right]^\alpha (r_c) e^{-\alpha} = \frac{r_s}{r + \pi}. \quad (5)$$

Simplifying both sides of Eq. (5) and then rearranging terms gives us an expression for the return to creative capital relative to the return to social capital. That expression is⁶

$$\frac{r_c}{r_s} = \frac{1}{A} e^\alpha \left[\frac{r + \pi}{\alpha} \right]^\alpha. \quad (6)$$

Equation (6) clearly tells us that as the optimal time spent in school or T^* increases, the return to creative capital relative to the return to social capital decreases. The way to interpret this result is as follows. In our model, T^* increases because the return to schooling parameter α increases. Now, an increase in α means that, *ceteris paribus*, schooling is a more attractive option and this feature tends to increase the supply of creative capital and thereby depress the relative return to creative capital. We now use Eq. (6) to study the nature of the dependence of the return to social capital r_s on the four specific parameters of our model.

4 Aspects of social capital

4.1 Comparative statics

We want to study the nature of the dependence of the return to social capital r_s on the return to schooling parameter α , the critical capital accumulation shift parameter A , the regional interest rate r , and the instantaneous death probability π . To proceed further, it will be helpful to rewrite Eq. (6) in a more convenient form. Now, using the fact that $\{\alpha/(r + \pi)\}^\alpha = \exp[\alpha \log_e \{\alpha/(r + \pi)\}]$ and assuming that the inequality $\alpha > r + \pi$ holds, the rewritten Eq. (6) we seek is

$$r_s = A e^{-\alpha} (r_c) e^{\alpha \log_e \{\alpha/(r + \pi)\}}. \quad (7)$$

⁵ Only if this condition holds in our regional economy will there be individuals with social capital producing the nontradable good.

⁶ Note that the hourly earnings of a member of the creative class who has accumulated creative capital optimally or $A(T^*)^\alpha (r_c)$ must exceed the return to social capital r_s .

Differentiating both sides of Eq. (7) with respect to α , A , r , and π gives us, after several steps of algebra, four comparative statics results. They are

$$\frac{dr_s}{d\alpha} > 0, \quad \frac{dr_s}{dA} > 0, \quad \frac{dr_s}{dr} < 0, \quad \frac{dr_s}{d\pi} < 0, \quad (8)$$

Equation (8) tells us that the return to social capital *increases* when either the return to schooling parameter (α) or the creative capital accumulation shift parameter (A) rises. To understand this result, note that a rise in either α or A results in more schooling being sought. This tends to increase the supply of creative capital and this last outcome tends to lower the return to creative capital r_c and raise the return to social capital r_s .

In contrast, when either the regional interest rate (r) or the instantaneous death probability (π) rises, the return to social capital *decreases*. This occurs for reasons that are the opposite of the ones that we have just given in the previous paragraph. Specifically, an increase in either r or π (high mortality) results in less schooling being sought. In turn, this reduces the supply of creative capital, raises the return to creative capital r_c and lowers the return to social capital r_s . The final question that remains to be answered in this paper is the following: For a given interest rate r , what is the impact of increased creative capital accumulation (increased schooling) on the relative price of the nontraded good in our regional economy? The answer is provided in the next section.

4.2 Relative price of the nontraded good

Let p denote the relative price of the nontraded good in our regional economy and let the regional interest rate r be given. Now suppose that more schooling is sought in our regional economy because of high α , high A , or low mortality π . Our analysis in Sect. 4.1 tells us that high α , high A , or low mortality π will result in an increase in the return to social capital r_s . If r_s is higher then because the interest rate r is given, the relative price of the nontraded good p will also be higher.

In addition, assuming free trade between the region under study and other regions, the price of the traded good will be the same both inside and outside this region. Further, if we measure the basic human input of the individuals in our regional economy with man-hours then more creative capital translates into higher measured relative productivity in the tradable sector. Put differently, higher productivity in the tradable sector goes along with a higher relative price in the nontradable sector.

Readers familiar with the contemporary literature in international economics will recognize that the result we have just obtained in the previous paragraph for a region is similar to the prominent Harrod–Balassa–Samuelson effect which says that there is “a tendency for countries with higher productivity in tradables compared with non-tradables to have higher price levels” (Obstfeld and Rogoff 1996, p. 210).⁷ This completes the discussion of the relative price of the nontraded good in our regional economy.

⁷ For a lucid textbook account of the Harrod–Balassa–Samuelson effect the reader should consult Obstfeld and Rogoff (1996, pp. 210–216).

5 Conclusions

In this paper, we conducted a theoretical analysis of a two sector model of a regional economy with social capital and creative capital in the sense of Florida (2002). In this setting, we provided the first formal analysis of the creative capital accumulation decision faced by individuals in our regional economy and then we calculated the optimal length of time during which creative capital is accumulated. Next, we ascertained the relative return to creative capital and we used this return to conduct comparative statics exercises involving the four parameters of our model. Finally, we showed that for a given interest rate, the relative price of the nontraded good is higher in regional economies where more creative capital is accumulated.

The analysis in this paper can be extended in a number of different directions. In what follows, we suggest two possible extensions. First, it would be useful to analyze a model of the creative capital accumulation process in which the rewards accruing to creative and social capital are variable and not constant. Because creative capital is not “manna from heaven,” it can be accrued deliberately. When thought of in this way, it should be possible to position and study the accumulation of creative capital in the context of endogenous growth theory. Second, the decision to accumulate creative capital can also be profitably studied by examining the case in which the income foregone from working in the nontradable sector is stochastic and not deterministic. Studies that analyze these aspects of the underlying problem will provide additional insights into the nexuses between alternate ways of accumulating creative capital and the workings of two sector regional economies.

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